

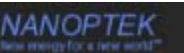
















California Energy Commission

April 23, 2014

This presentation is incomplete without the accompanying oral discussion.

Massachusetts FCEV Working Group

<i>Industry</i>	<i>State & Federal</i>	<i>Fleets</i>	<i>Automakers</i>
        	      	      	   

Station Funding Program

1. Size the fleet to match the output of a 50 kg/day H₂ station (18-50 cars).
2. Establish a Hydrogen Purchase Agreement (HPA) between the fleet owner and the station operator.
3. Station operator, using the HPA as collateral, uses 3rd party funding for his CAPEX in the same way the solar industry used PPA's.

H2 Site Generation Industry Response – station makers each confirmed the HPA process allows them to fund stations - Nuvera Fuel Cells, Giner, Angstrom Advanced (Verde) and Nanoptek.

Timing - Gain 3 to 5 Fleet Commitments by end of 2014 – Expect Delivery by End of 2015.

Transition from fleet to retail by end of 2015 - Reduce % HPA reliance at H₂ stations to free capacity for retail use in phases – 30% reduction then 50% reduction to 75% to zero.

H2 Station Utilization Programs Blend Fleet/Retail



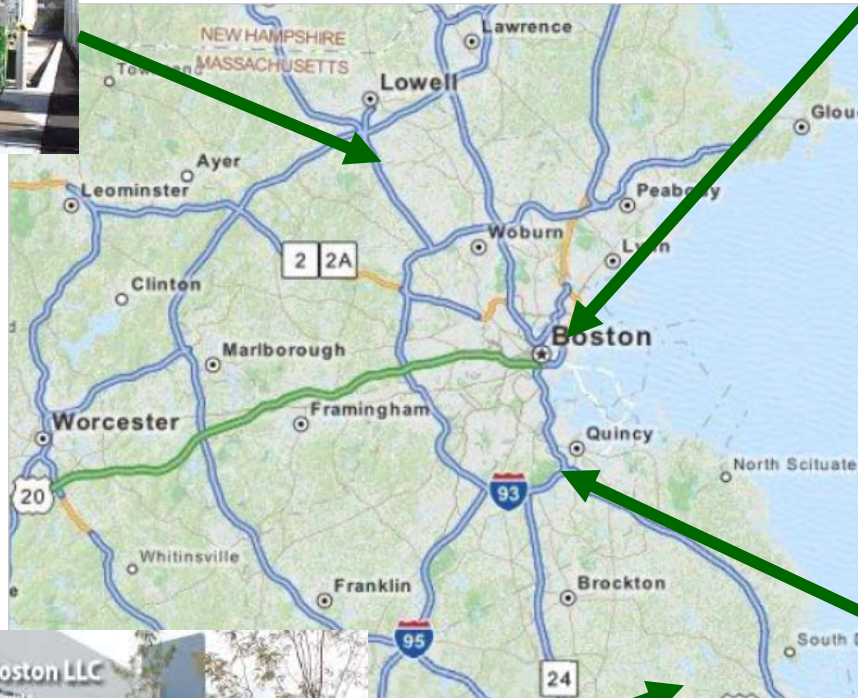
- **Bus, Commuter.** One bus equals one 50 kg H2 station. Consortium - Logan International Airport (operated by Massport), the operator of Framingham Logan Express, and an FCEV integrator.
- **Ground Support Equipment (FC Powered).** To compliment demand for hydrogen negotiate with Logan and Airlines to convert baggage tugs to FCEV.
- **Medium Duty Delivery Fleet FC Range Extender Hybrid.** A major retailer has agreed to explore conditional order for 20 units subject to performance of one.
- **Bus, Mass Transit.** MTBA Nuvera FC bus not due until end of 2014. Use that experience to expand FC Mass Transit Bus population in state starting in 2015.
- **Bus, Regional Transit.** A Regional Transit Authority is moving to CNG over the next several months. They have expressed interest in FC Battery Electric Hybrids and are interested in creating a shared fueling station that supports a retail FCEV program.

Massachusetts Hydrogen Fueling Stations



Nuvera, Billerica,
MA
In Operation Now,
Fueling 2 Toyota
Highlanders,

SYSCO, Plympton,
MA
Distribution Center
relies “only” on FC
powered fork lifts.
Over 230 are on
site.

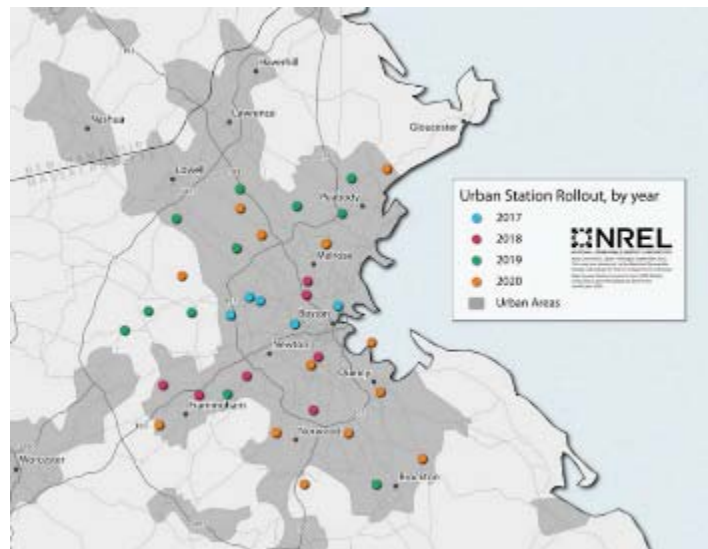
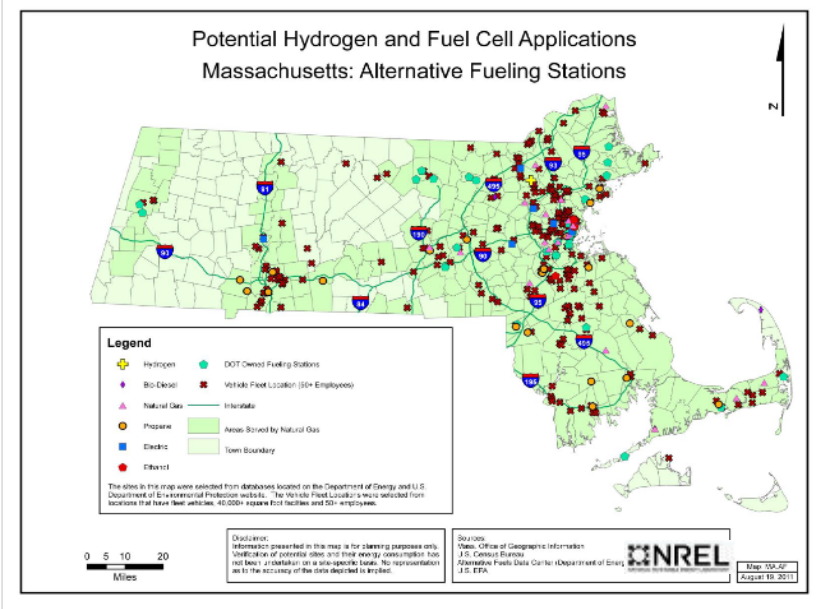
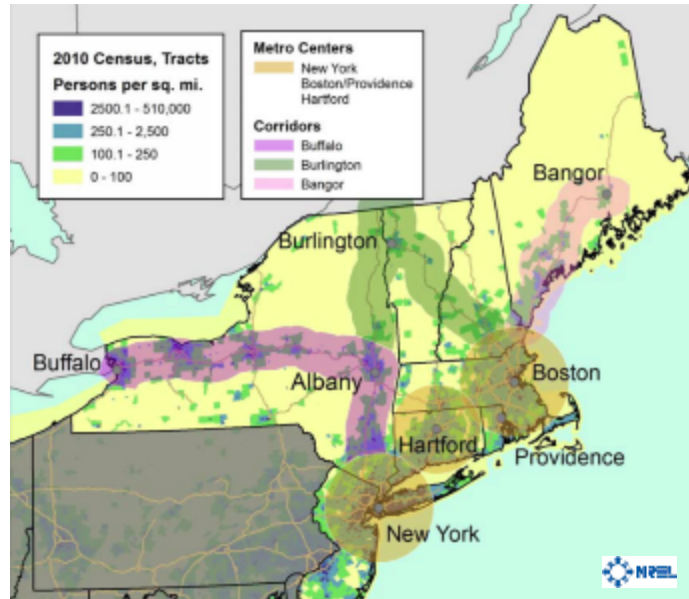


T Massachusetts Bay
Transportation Authority
MTBA Charlestown,
MA
1 FC Bus, Delivery
In Late 2014



Proton OnSite,
Braintree, MA
Mid 2014 Start Up

Concept Refueling Roadmaps



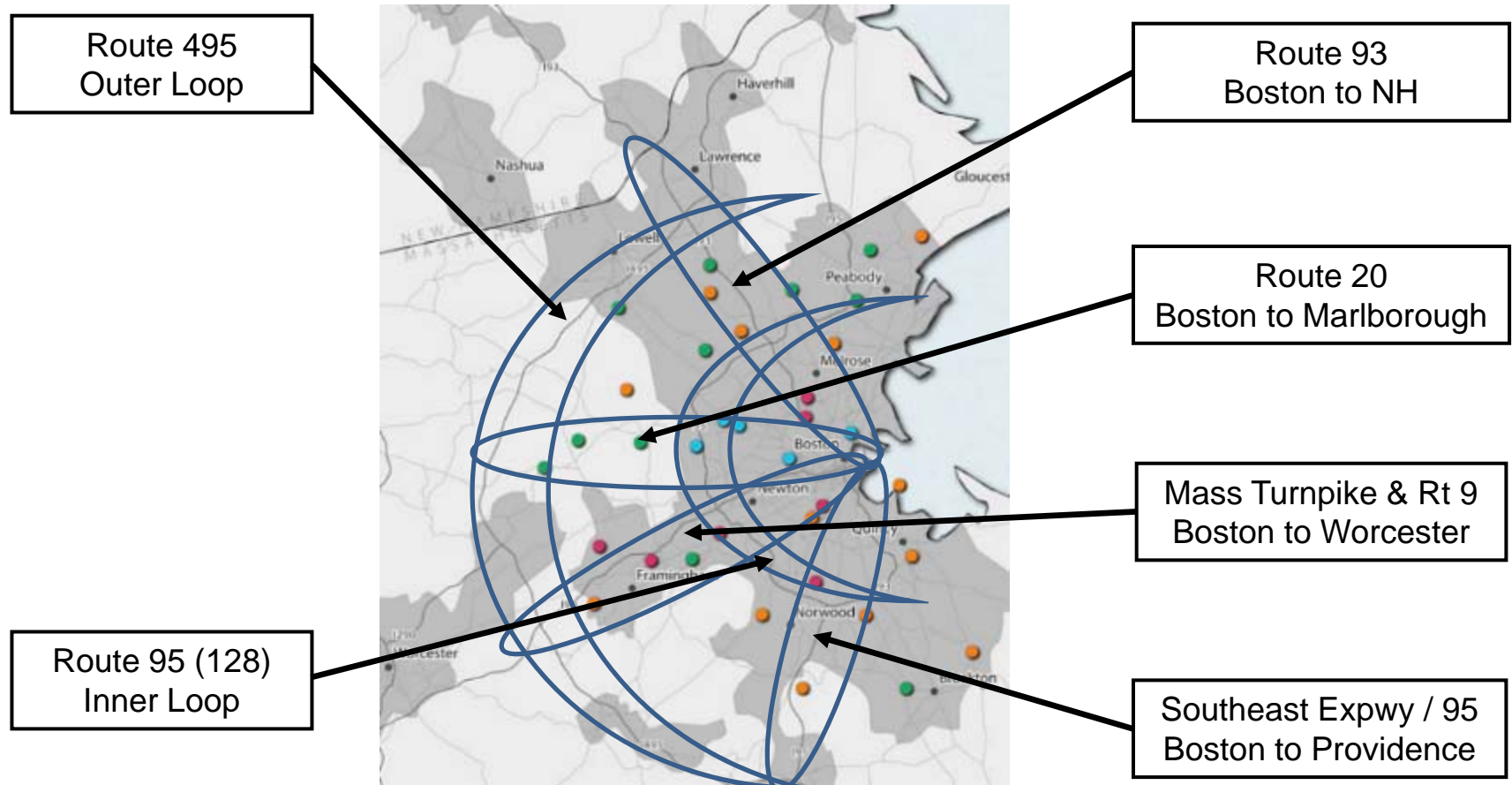
Top left map - basic northeast corridors in need of H2 infrastructure coverage.

Top right map – an early rendition of station locations to meet a 2020 vehicle population.

Lower left map - an example of what a phased station location plan might be for the initial launch years of the greater Boston FCEV market. Years will be restated and start at 2015.

Greater Boston H2 Based on NREL Mapping

Greater Boston Concept 4 Spokes – 2 Loops



Summary

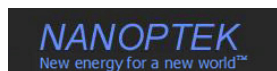
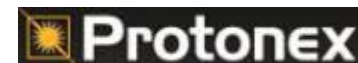
Transition – Fleet to Retail

- 2014 start fleet / HPA program commitments for delivery in second half of 2015.
- October 2015 and running parallel to the fleet sales program, the launch retail consumer FCEV sales program.
- Reduce % HPA reliance at H2 stations to free capacity for retail use in phases – 30% reduction of reliance on fleet use, then 50% reduction to zero.

Moving Forward – Short Term

- Facilitation discussions that size a fleet to match the specific hydrogen output of a station (2014 station size ~50 kg/day) and negotiations between the automakers, station operators and H2 fueling suppliers.
- Massachusetts Electric Vehicle Initiative Task Force (MEVI) will offer ZEV rebates and other purchase incentives.
- Create a pooling of smaller fleets in close proximity into a central H2 fueling site using a modified HPA agreement allowing for multiple fleet users.
- Add connector stations to other regions using Sturbridge and Lee.

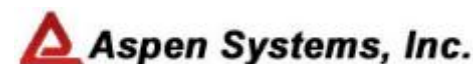
Massachusetts Hydrogen Coalition



Charles Myers
cmyers@massh2.org
(508) 380-1759



AVSG



Energy For A Clean Planet™